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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,920	11/19/2003	Kurt W. Kramarz	937-1533	6420

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EXAMINER	
KEYS, ROSALYND ANN	

ART UNIT	PAPER NUMBER
1621	

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/716,920

Applicant(s)

KRAMARZ ET AL.

Examiner

Rosalynd Keys

Art Unit

1621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 3-10 and 12-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-10, and 12-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Status of Claims***

1. Claims 1, 3-10, and 12-28 are pending.  
Claims 1, 3-10, and 12-28 are rejected.  
Claims 2 and 11 are cancelled.

### ***Response to Amendment***

#### **Claim Objections**

2. The objection to claims 3 and 7 is withdrawn, due to the amendment to said claims, filed November 6, 2007.

### ***Response to Arguments***

3. Applicant's arguments, see pages 8 and 9, filed November 6, 2007, with respect to the rejection(s) of claim(s) 1, 3-10, and 12-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barker et al. (US 4,426,542) alone or in view of Starks et al. (Phase Transfer Catalysis, 1994, pp. 482-488), Halpern et al. (Spec. Publ.-R. Soc. Chem, 1999, pp. 30-39) or Judge et al. (UK 1 547 856) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Barker et al. (US 4,426,542) in view of Kwok et al. (US 5,801,292), Starks et al. (Phase Transfer Catalysis, 1994, pp. 482-488), Halpern et al. (Spec. Publ.-R. Soc. Chem, 1999, pp. 30-39) and Judge et al. (UK 1 547 856).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 3-10, and 12-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barker et al. (US 4,426,542) in view of Kwok et al. (US 5,801,292), Starks et al. (Phase Transfer Catalysis, 1994, pp. 482-488), Halpern et al. (Spec. Publ.-R. Soc. Chem, 1999, pp. 30-39) or Judge et al. (UK 1 547 856).

Barker et al. teach an aldol condensation reaction with carbon 5 and 6 aldehydes to produce a mixture comprising unsaturated aldehydes, which are hydrogenated to C12 or C14 alcohols (example 14). The aldol reaction takes place in the presence of aqueous sodium hydroxide and a tetrabutyl-ammonium chloride phase transfer catalyst (water-soluble phase-

transfer catalyst). The aldol reaction is conducted at temperature upwards of 60°C up to 150°C or higher (see column 3, lines 15-20). It is taught that the aldehyde product mixture is subjected to an aldol reaction, followed by decantation and water washing or other simple procedures to separate the organic product-containing phase from the aqueous phase. The product-containing phase is then hydrogenated, converting both the C5 aldehydes and C10 enals to the corresponding alcohols (see column 6, lines 25-32). The aldol reaction may be continuous or batch (see column 3, lines 60-65).

Barker et al. differ from the instant claims in that Barker et al. do not conduct an aldol reaction between mixed aldehydes having different numbers of carbon atoms.

Kwok et al. teach that it is commonly known that the aldol condensation reaction may be used not only for the condensation of a given aldehyde, but for the combination of different aldehydes, producing a so-called "cross aldol", provided that at least one of the aldehydes contains an alpha hydrogen (see entire disclosure, in particular column 1, lines 58-67). The aldehydes disclosed by Kwok et al. have the formula R1CHO and R2CHO, wherein R1 may be an alkyl group having from 1 to 12 carbon atoms and R2 may be a H atom or an alkyl group having from 1 to 12 carbon atoms (see column 3, line 46 to column 4, line 40). Kwok et al. further teaches that the unsaturated aldehydes may be hydrogenated to the desired product (see column 3, lines 5-19 and column 4, lines 40-42).

One having ordinary skill in the art at the time the invention was made would have found it obvious that the aldol condensation process disclosed by Barker et al. could be carried out utilizing different aldehydes, as disclosed by Kwok et al., including those aldehydes as claimed, with the expectation of obtaining the desired unsaturated aldehydes via a cross aldol condensation reaction, since Kwok et al. teach that aldol condensations can be conducted on a given aldehyde as well as a combination of different aldehydes.

Barker et al. teach the claimed invention as disclosed above but fail to teach removing

the phase transfer catalyst by water washing.

Halpern et al. teach removal of quaternary ammonium salts from organic phase with water washing (see pages 34 and 35).

One having ordinary skill in the art at the time of the invention was made would have found it obvious to remove the PTC from the reaction product of Barker et al., by water washing the PTC as taught by Halpern et al., since Halpern et al. teach that water washing has been shown to be an effective means for extracting quaternary ammonium salts from an organic phase.

Barker et al. fail to teach the claimed molar ratios. However, modification of concentration of reactants is often done to optimize conversions and yields. Further, a change in temperature, concentrations, or other process conditions of an old process does not impart patentability unless the recited ranges are critical, i.e., they produce a new and unexpected result. In re Aller et al., (CCPA 1955) 220 F2d 454, 105 USPQ 233.

Barker et al. fail to teach using sodium hydroxide in a 10-50% weight solution.

Judge et al. teach an aldol concentration reaction wherein the alkali metal hydroxide solution is 4-50%, more preferably 5-15%, by weight (see page 3, lines 35-43).

One having ordinary skill in the art at the time the invention was made would have found it obvious to utilize an aqueous alkali metal solution, in the range taught by Judge et al., in the process of Barker et al., since Judge et al. has shown that this range is effective for use in aldol condensation reactions.

Barker et al. differ from the instant invention in that Barker et al. do not teach conducting the crossed-aldol reaction in a three-phase system.

Halpern et al. teach that there are several criteria to be considered when choosing a phase-transfer catalyst for a commercial phase-transfer catalysis application. The most important criteria are reactivity, separation of catalyst from the product, availability, the real

cost of catalyst and solvent, method of environmentally acceptable disposal, catalyst stability and toxicity (see page 30). Halpern et al. compare three widely used PTCs, namely Aliquat®336 (methyl tricapryl ammonium bromide); Aliquat®100 (tetrabutyl ammonium bromide) and Aliquat®175 (methyl tributyl ammonium chloride). Halpern et al. teach that most PTC systems work at very high ionic strength, and that Aliquat®175 in particular, excels in PTC reactions using 50% NaOH. Halpern et al. teach that at these ionic strengths, even the most hydrophilic quat salts are salted out of the aqueous phase (see page 36). It is further taught on page 36 that in some cases with high ionic strength a third phase can be formed with tetrabutylammonium salts and a very high reactivity may be observed.

Starks et al. (see page 10 and pages 253-255) teach that tetrabutylammonium salts forms a third layer (phase) when used in conjunction with an organic phase that has little polarity and with a concentrated aqueous solution of inorganic salts. Starks et al. teach that in this situation, most of the reaction occurs in the third phase with both aqueous and organic reagent transferring to this phase for conversion, which allows for a faster reaction than with simple PTC reactions. Starks et al. teach that because formation of a third phase offers simplified catalyst removal and recovery procedures, third-phase catalysis is highly attractive for commercial operations.

One having ordinary skill in the art the time the invention was made would have been motivated to carry out the reaction of Barker et al. utilizing a third phase as taught Starks et al. and Halpern et al., since Starks et al. teach that third phase reactions may be faster than simple PTC reactions and formation of third phase offers simplified catalyst removal and recovery procedures and Halpern et al. teach that very high reactivity may be observed with the use of a third phase.

Note: The Examiner has considered the comparative data given by Applicants but did not find that the results obtained were unexpected based upon the teachings of the prior art.

**Conclusion**

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hagemeyer et al. (US 2,852,563). Hagemeyer et al. teach condensation of isoaldehydes with lower aliphatic aldehydes (see entire disclosure).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosalynd Keys whose telephone number is 571-272-0639. The examiner can normally be reached on M, R & F 5:30-7:30 am & 1-5 pm; T & W 5:30 am-4 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler can be reached on 571-272-0871. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rosalynd Keys/  
Primary Examiner  
Art Unit 1621

January 17, 2008